

Lehrstuhl Anlagen- und Prozesstechnik

Higee separations in RPBs

Although separation processes in columns are well-known, they are limited by capacity and mass transfer. Rotating Packed Beds (RPBs) are a promising way to overcome these limitations by applying a centrifugal field. Nevertheless, a lack of understanding of unit operations conducted in RPBs is present. For this reason, namely, the unit operations absorption, stripping, and distillation are investigated intensively at the chair of fluid separations.

The rotating packed beds are investigated regarding operation parameters like fluid capacity and design parameters like packing types. In cooperation with the Lodz University of Technology, we design internals for the RPBs with CFD simulations. Furthermore, tailor-made packings are manufactured at our laboratory with 3D-printing technology and characterized according to their performance. Based on the theoretical and experimental results, the equipment design is further developed and improved.

Distillation is a promising field of application for RPBs, and in our laboratory, mass transfer phenomena inside the rotor are investigated in detail. The use of a telemetric system enables deep insights into mass transfer processes within the rotor. The radial temperature profile can be measured, and composition of the phases can be determined.

A further field where RPBs offer great potential in removing volatile organic compounds from high viscous media, which is challenging due to the high resistance to mass transfer. RPBs can overcome those limitations by generating thin films which enhance the mass transfer compared to conventional processes.

Additionally, we are collaborating with project partners from industry. The aim is to investigate the applicability of RPBs for cryogenic processes. Compared to conventional equipment, the small footprint of those machines leads to less heat input from the environment and thereby less energy demand for the cold utilities.

